

NON-PUBLIC?: N
ACCESSION #: 9501310225
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Joseph M. Farley Nuclear Plant - Unit 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000364

TITLE: Reactor Trip Due To A Loss of Turbine DEHC Overspeed
Protection
EVENT DATE: 12/25/94 LER #: 94-004-00 REPORT DATE: 01/24/95

OTHER FACILITIES INVOLVED: J. M. Farley Unit 1 DOCKET NO: 05000348

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: R.D. Hill, General Manager TELEPHONE: (334) 899-5156
- Nuclear Plant

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: JJ COMPONENT: DCC MANUFACTURER: W120
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 1534, on December 25, 1994, with Unit 2 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of digital electro-hydraulic control (DEHC) overspeed protection. Investigations indicated the primary overspeed protection (OPC) controller (DROP 2) failed in a manner which prevented the redundant OPC controller (DROP 52) from assuming control of the turbine DEHC overspeed protection function within the required time frame. This resulted in a turbine trip due to a loss of both OPC controllers. Six cards associated with the DEHC system (three associated with the DROP 2 processor) have been replaced and forwarded to the vendor for evaluation.

The unit was returned to power operation at 2123 on December 26, 1994.

Subsequently, on January 13, 1995, with Unit 1 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of DEHC overspeed protection. An evaluation of this Unit 1 event indicated that both reactor trips could have been caused by the vulnerability of the DEHC OPC processors and their associated power supplies to minor voltage transients. Modifications have been performed to the Unit 1 DEHC in order to reduce the vulnerability to minor voltage transients. Preparations to perform DEHC modifications on Unit 2 are currently in progress.

END OF ABSTRACT

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Plant and System Identification

Westinghouse -- Pressurized Water Reactor
Energy Industry Identification System codes are identified in the text as XX!.

Description of Event

At 1534, on December 25, 1994, with Unit 2 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of digital electro-hydraulic control (DEHC) overspeed protection.

Cause of Event

A root cause investigation indicated that the primary overspeed protection (OPC) controller (DROP 2) within the DEHC system JJ! failed in a manner which prevented the redundant OPC controller (DROP 52) from assuming control of the DEHC overspeed protection function within the required time frame. This resulted in a turbine trip due to a loss of both OPC controllers. There were no apparent indications that would attribute this event to an intermittent failure in the 63AST-2 auto stop oil pressure switch63! (Reference LER 94-003, Unit Two). Three individual logic cards within the DEHC system which processes an electrical output from the 63AST-2 pressure switch were suspect. Additionally, three cards associated with the DROP 2 processor which receives input from the three referenced logic cards were suspect. These six cards were replaced.

Subsequently, on January 13, 1995, with Unit 1 in mode 1 operating at 100 percent power, the reactor tripped due to a turbine trip in response to a loss of DEHC overspeed protection. A root cause investigation of this Unit I event indicated that the primary OPC controller (DROP 2) failed in

a manner which prevented the redundant OPC controller (DROP 52) from assuming control of the DEHC overspeed protection function within the required time frame. This resulted in a turbine trip due to a loss of both OPC controllers. As part of the investigation process, the power supplies associated with the OPC processors were tested. Additionally, Farley Nuclear Plant specific software and hardware revision levels were assembled in a test system by the vendor. Conditions observed during on-site testing under certain voltage transients were re-created in the test system. Test results concluded that the OPC processors and their associated power supplies were vulnerable to minor voltage transients and under certain conditions were unable to transfer OPC control within the required time frame.

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Further review of data associated with the Unit 2 December 25, 1994 reactor trip indicates that both the 12/25/94 Unit 2 trip and the 1/13/95 Unit 1 trip could have been caused by the vulnerability of the DEHC OPC processors and their associated power supplies to minor voltage transients.

Safety Assessment

This event is reportable because of the actuation of the reactor protection system.

All systems operated as designed.

This event would not have been more severe if it had occurred under different operating conditions.

Corrective Action

A root cause analysis investigation was performed.

Six cards associated with the DEHC system have been replaced and forwarded to the vendor for evaluation. To date, testing of the suspect cards has been unable to re-create a card failure. A conclusive determination that the Unit 2 trip on December 25, 1994 and the previous Unit 2 trip on December 18, 1994 were related, has not been reached at this time.

DROP 52 has been placed in the primary OPC controller status, and DROP 2 has been placed in the redundant OPC controller status.

Modifications have been performed to the Unit 1 DEHC. Preparations to

perform Unit 2 DEHC modifications are currently in progress. These modifications will reduce the vulnerability of the DEHC OPC processors and their associated power supplies to minor voltage transients.

Additional Information

The turbine's mechanical overspeed trip device was operable during this event.

An independent review team has been assembled to conduct a review of the information surrounding this event and the December 18, 1994 event (LER 94-003, Unit Two).

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The following LER's involved reactor trips associated with DEHC system failures.

Reactor Trip Due To Turbine Control System Intermittent Failure: LER 94-03, Unit 2.

Manual reactor trip due to governor valve closure caused by a degraded DC voltage output from the primary Operator Auto Controller power supply in the main turbine DEHC system and a failure of the circuitry which should have transferred the power supply: LER 91-010, Unit One.

Reactor trip caused by a voltage transient on the DEHC inverter: LER 89-015, Unit Two.

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J. D. Woodard Southern Nuclear Operating Company
Executive Vice President the southern electric system

January 24, 1995

Docket No.: 50-364 10 CFR 50.73

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk

Washington, DC 20555

Joseph M. Farley Nuclear Plant-Unit 2
Licensee Event Report No. 94-004-00
Reactor Trip Due To Loss of Turbine
Digital Electro-Hydraulic Control Overspeed Protection

Gentlemen:

Joseph M. Farley Nuclear Plant Licensee Event Report No. 94-004-00 is being submitted in accordance with 10 CFR 50.73. If you have any questions, please advise.

Respectfully submitted,

Jack Woodard

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Enclosure

cc: Mr. S.D. Ebnetter
Mr. B. L. Siegel
Mr. T. M. Ross

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